

State of California  
The Resources Agency  
DEPARTMENT OF FISH AND GAME  
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Sacramento, California 95814

Inland Fisheries - Informational Leaflet No. 20

ROTENONE USE IN PRIVATE WATERS TO CONTROL FISH POPULATIONS

This leaflet summarizes information on the use of rotenone for fish population control in privately-owned lakes, ponds or other impounded waters. **Please note that private individuals may not use rotenone or other fish toxicants in flowing waters such as rivers, creeks, canals or drains.** Further, any privately-owned waters that are treated with rotenone must be completely within the property boundaries of the person making the rotenone application. Rotenone is an extremely effective fish toxicant. If released into flowing water, it has the potential to kill fish for several miles downstream. Rotenone users are warned that they are legally responsible for any fish kills due to spills or unauthorized uses in flowing waters. Fish toxicants like rotenone must be used with extreme caution.

Background Information

Rotenone is derived from the roots of tropical plants in the bean family (*Leguminosae*). The roots of rotenone-bearing plants have been used by people for centuries to capture fish to be used as food. The California Department of Fish and Game (CDFG) began using rotenone as a fishery management tool in the 1930s.

Rotenone kills fish and other gill-breathing organisms by interfering with oxygen use at the cellular level. Rotenone, when used as a fish toxicant, poses no significant risk to other wildlife species such as birds and mammals. This includes mammals that consume the carcasses of fish that have been killed by rotenone. Further, livestock and pets that consume rotenone-treated waters will not be affected.

**As with all pesticide products, users must carefully read and follow the use instructions provided on the product label.**

**Failure to comply with product label instructions  
is a violation of federal and state law.**

## Permits

In some cases, three separate permits may be required for using rotenone to control fish.

### **1) California Department of Fish and Game Permit**

State regulations require that you obtain a permit from the CDFG before you chemically treat a lake or pond to control fish populations. A permit application is attached to this leaflet. The permit is free and is valid for 60 days from the date of issuance. You may not treat your pond or lake until the permit has been authorized by the CDFG. Contact information for CDFG Regional Offices can be obtained by calling (916) 653-7664 or by visiting the CDFG homepage [www.dfg.ca.gov](http://www.dfg.ca.gov).

CDFG personnel may request that they be present during the chemical application. The regional CDFG office must be notified at least ten days in advance of the intended date of the chemical application.

### **2) County Agricultural Commissioner Permit**

In some circumstances, you may need to obtain a permit or other certification from your local county agricultural commissioner before you can purchase and use rotenone. Some pesticides are classified as *restricted use* pesticides because of the hazard they pose to people and the environment. *Restricted use* pesticides generally require a permit for purchase and use. Rotenone is a *restricted use* pesticide because of its toxicity to fish. Please consult your local telephone directory for contact information for your county agricultural commissioner's office.

### **3) Regional Water Quality Control Board Permit**

In some circumstances, applying pesticides like rotenone to water may require a National Pollution Discharge Elimination System permit (NPDES permit) from the Regional Water Quality Control Board (RWQCB). For more information on NPDES permits for rotenone use, please contact your RWQCB. Contact information for RWQCBs can be obtained by visiting the website of the State Water Resources Control Board, <http://www.swrcb.ca.gov/regions.html>

### Information on Applying Rotenone

Rotenone is available in several different formulations, including powder and liquids. These different formulations require different use methods. It's important that rotenone applicators closely follow the use instructions provided with the product label in order to achieve the desired results and to protect people and the environment. Failure to comply with product label instructions is a violation of federal and state pesticide use regulations.

Before determining how much rotenone to purchase, the user will need to know the volume of the water to be treated. Water volume is commonly measured in acre-feet. One acre-foot is the amount of water that would cover one acre to a depth of one foot.

To calculate acre-feet, first measure the surface area of the water body. The surface area of a rectangular body of water is equal to the length (in feet) times the width (in feet). This will give you the surface area in square feet. Next, multiply this surface area value by the average depth in feet. This will give you the volume of the water body in cubic feet. Finally, divide this cubic feet measurement by 43,560 (the number of square feet in an acre). This will give you the volume of the water body in acre-feet.

Here's an example:

### **Calculating Water Volume in Acre Feet**

**Step 1:** 363 feet (length) X 180 feet (width) = 65,340 square feet.

**Step 2:** 65,340 square feet X 4 feet (avg. depth) = 261,360 cubic feet

**Step 3:** 261,360 cubic feet / 43,560 = **6 acre-feet**

Once the water volume has been calculated, users must follow the directions provided on the manufacturer's product label including the application rates, equipment to be used and safety precautions.

### After the Treatment

Not all the fish will die immediately after treatment. A complete kill may take several hours, or in some cases, nearly a full day. Rotenone is not a particularly long-lived chemical in the environment. Rotenone, like other organic compounds, is eventually broken down into its simple elemental components, carbon, oxygen and hydrogen. In most cases, the water will no longer be toxic to fish after one or two weeks. However, this is dependant on several factors

including water temperature and the amount of sediment and organic matter in the water. Ponds or lakes that are covered with ice may require several months for neutralization. Under all cases, users are cautioned not to release rotenone-treated water into downstream areas or to restock fish until it has been determined that the treated water is no longer toxic to fish. Treated water can be tested by a simple procedure. Fish placed in wire cages (i.e., minnow traps) placed at several locations and depths throughout the treated water body will indicate whether or not the water is still toxic to fish.

Dead fish pose no significant hazard to wildlife or domestic animals. However, users should collect and dispose of the fish carcasses to prevent odor or nuisance insect problems. The CDFG strongly recommends that rotenone users dispose of dead fish promptly and that fish killed by rotenone not be used for human consumption. Eating dead fish may cause bacterial or other food-borne illnesses.

### Additional Information

California and other states have strict laws governing the use of chemicals in water. Be certain that you carefully follow the instructions provided by rotenone product labels and the requirements of the California Department of Pesticide Regulation (CDPR), the Regional Water Quality Control Board and the CDFG. In some cases, it may be advisable to have private contractors apply the rotenone. Please consult your local telephone directory under the following suggested categories: “agricultural chemicals”, “pesticide applicators” or “lake or pond management”.

For more detailed information on rotenone and its use as a fishery management tool, please contact your regional CDFG office. Contact information for CDFG regional offices can be obtained by calling (916) 653-7664 or by visiting the CDFG homepage [www.dfg.ca.gov](http://www.dfg.ca.gov). The American Fishery Society also has an excellent technical and administrative manual on rotenone use. Information on this manual can be obtained by visiting the homepage of the American Fisheries Society [www.fisheries.org/rotenone](http://www.fisheries.org/rotenone).